



Health Technology Assessment (HTA) of Clinical Care Pathways: Peritoneal Dialysis Versus Hemodialysis

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INTRODUCTION

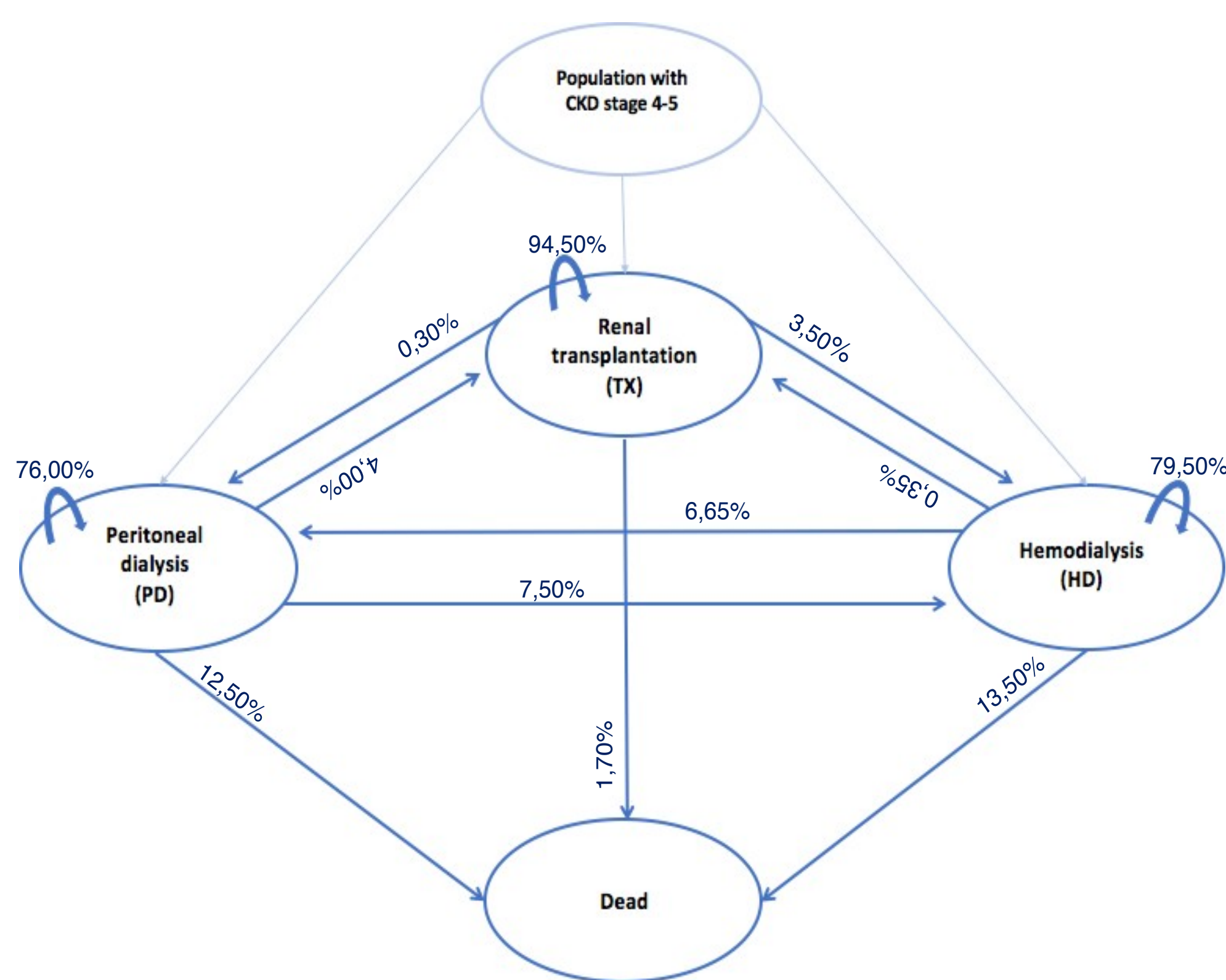
Chronic kidney disease (CKD) is a condition characterized by continued alteration of renal function for more than 3 months. The fifth and final stage of CKD, also known as end-stage renal disease (ESRD), occurs when there is complete loss of renal function. This advanced stage of CKD requires the use of renal replacement therapies (RRT), such as peritoneal dialysis (PD), hemodialysis (HD), or renal transplantation (TX) [1].

The present project aims to investigate, through a multidimensional assessment, the clinical course of peritoneal dialysis (PD) in comparison with inpatient hemodialysis (HD).

METHODS

The HTA report was structured according to the methodology defined by the EUnetHTA Core Model® (version 3.0) [2]. Through a literature review, the epidemiologic aspects of CKD, the management of care for stage 5-CKD patients, and the technical, efficacy, and safety characteristics of the treatment options under study were identified. The literature review was explicated using the PICO-model, and was conducted on the Pubmed database. The clinical-therapeutic pathway, defined consequently to the literature review, was then validated by a panel of clinicians experienced in the care of patients with CKD. The economic domain presents two analyses: a budget impact analysis (BIA), and a cost-utility analysis (CUA) based on a 4-cycle Markov model [Figure 1]. The Activity Based Costing (ABC) approach was used to develop both analyses, considering either the social or National Health Service (NHS) perspective.

Figure 1 – 4-stage Markov Model reworking by Moradpour et al. (2020) [3]



RESULTS

The search strategy produced a total of 4588 results. A total of 4235 records were excluded from the first screening, including a total of 374 studies. A total of 99 articles were included in the second screening, which were divided into the domains CUR (13), TEC (13), SAF/EFF (36), ORG (24), and ECO (13); some studies were included in more than one domain.

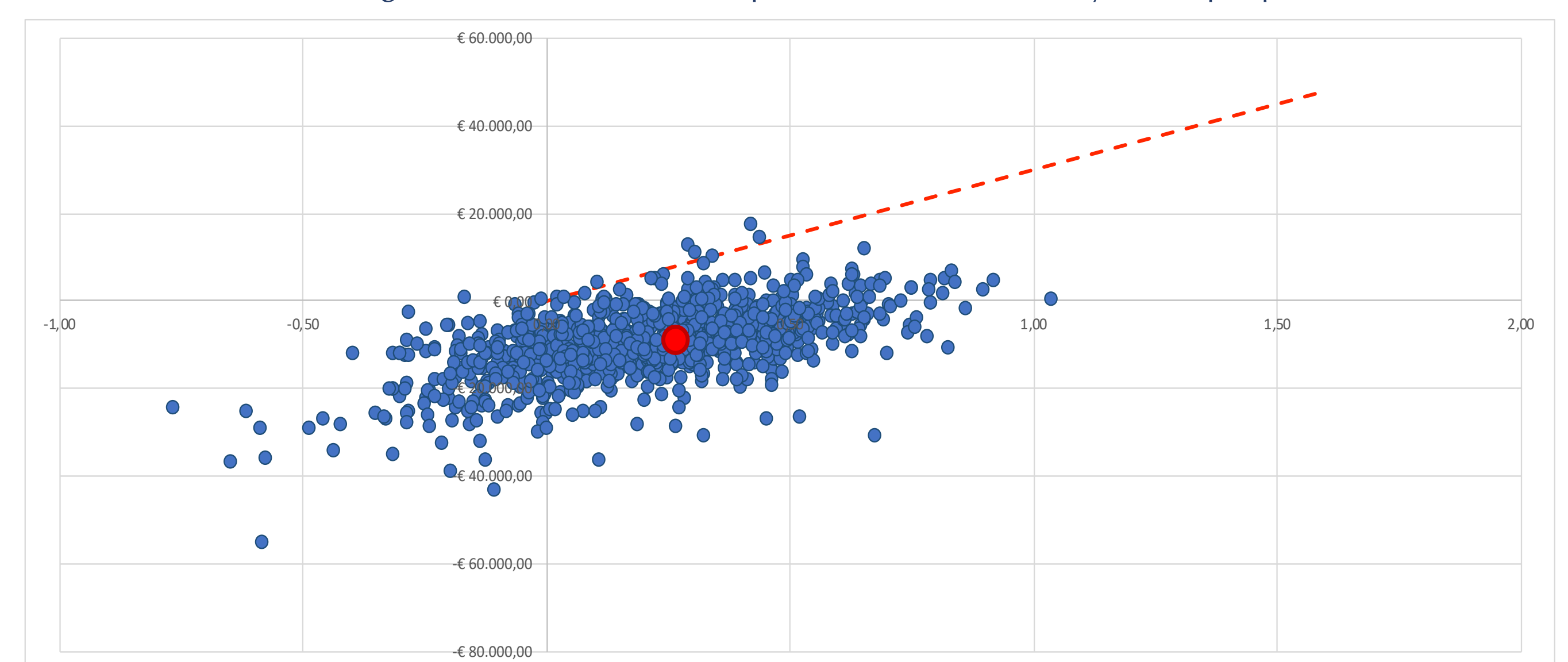
In Italy, in 2019, the incidence and prevalence level for CKD was identified as 16.2 and 81.1 per 100,000 population, respectively. A PD and HD utilization rate of 14.3% and 84.3% were also reported, respectively. Peritoneal dialysis (PD) is one of the main dialysis treatments to remove waste substances and excess fluid from the blood. PD involves the infusion of a sterile solution (dialysate) into the peritoneal cavity through a surgically implanted catheter, taking advantage of the peritoneal membrane as an exchange surface. The dialysate creates an osmotic gradient that drives ultrafiltration of water from the blood into the dialysate. This process removes waste and excess fluid, which is subsequently drained from the body through a single-lumen silicone rubber catheter.

Safety and efficacy analyses showed no significant differences between PD and HD. CUA's findings showed that PD is the dominant management strategy compared with HD, presenting PD a lower total cost than HD and a higher utility [Table 1]. These results emerged in both perspectives under analysis and were considered robust based on the sensitivity analyses conducted [Figure 2].

Table 1 – Utility Cost Analysis Results (social perspective) – Per Patient

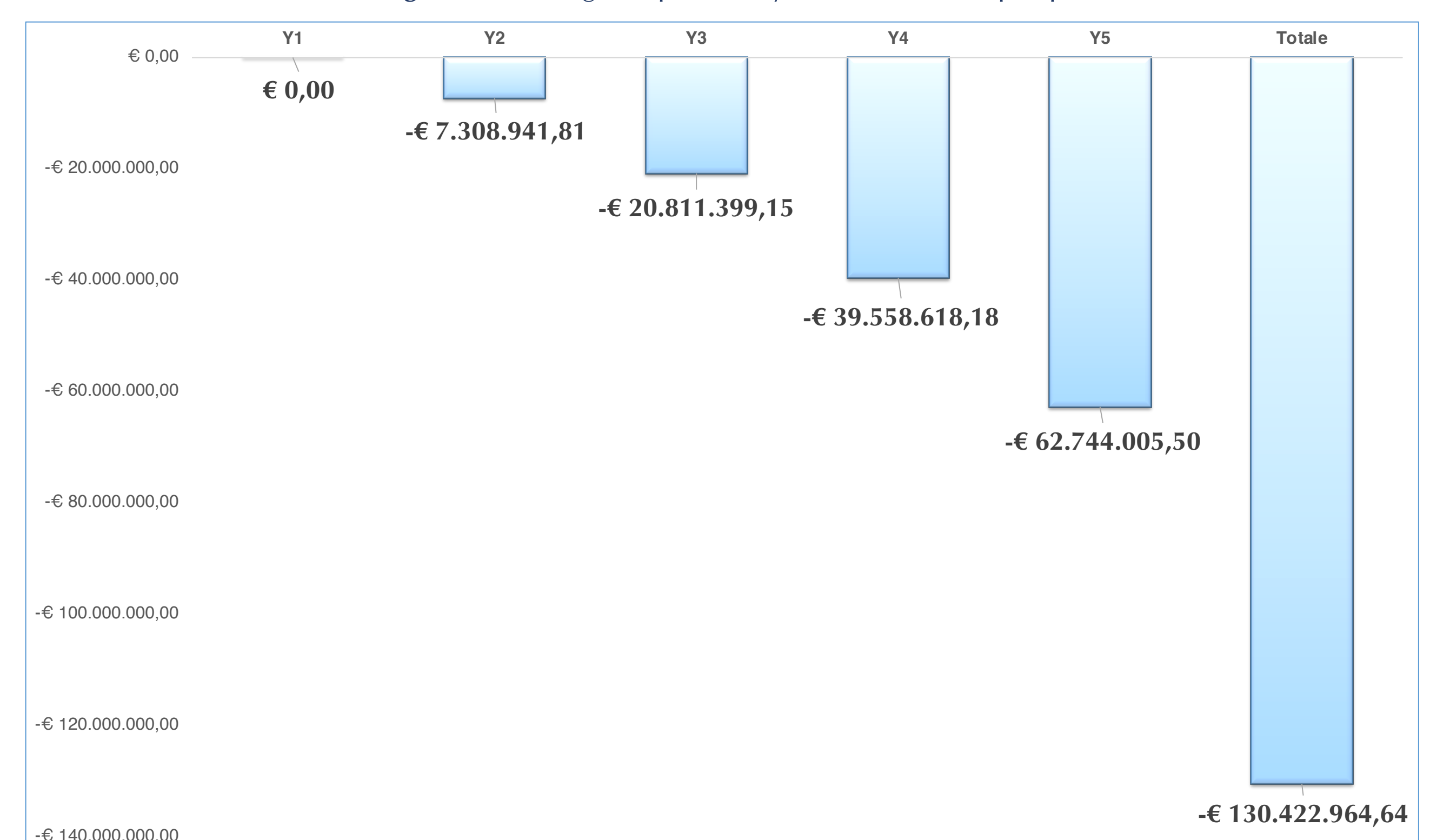
CUA results - Per patient					
	Total costs	Total utility	Δ Costs	Δ Utility	Incremental Cost Effectiveness ratio (ICER)
Peritoneal Dialysis (PD)	€ 39.162,80	1,20			
Inpatient hemodialysis (HD)	€ 48.021,82	0,94	-€ 8.859,02	0,26	Dominant

Figure 2 – Cost-effectiveness plan chart - PSA-Multi-way (social perspective)



The BIA results, in the social perspective, show that the incremental introduction of PD into clinical practice, and the corresponding proportional decrease in HD use, is associated with incremental financial resource savings over the years [Figure 3]. This saving reaches, over the time horizon considered, its peak in the fifth year of analysis reporting a saving per patient of € 554.18, resulting in a total saving per patient over the total 5 years of analysis of € 1,242.10.

Figure 3 – Budget Impact analysis results (social perspective)



CONCLUSION

In Italy, optimizing the use of PD versus HD in stage 5 MRC patients could result in resource savings, possibly leading to better resource allocation. From a social point of view, this optimization could result in increased income, reduced loss of productivity, and improved quality of life for patients and their families.

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